

3.3.3 Grassland Group

Grasslands are characterized by a lack of trees and tall shrubs and are dominated by grasses, sedges, and forbs. Grasslands occur on a wide variety of topographies, soil types, and moisture regimes - from water-covered peat to the driest sandy soils. For this report, the term grassland refers collectively to several native vegetation community types known as prairie and bracken grassland. Non-native grassland habitats, or surrogate prairie grasslands, will be discussed in Section 3.3.9.

Most of the information in Section 3.3.3 is reproduced or adapted from the WDNR Handbook "Ecological Landscapes of Wisconsin".

Prairies are located mostly in the southern and western parts of the state and are divided into six different types. Over 400 species of native vascular plants are characteristic of Wisconsin prairies, and most are restricted to prairie and savanna community types. In addition to a varied plant community, prairies have a diverse and specialized fauna, especially among prairie invertebrates, prairie and grassland herptiles, and grassland birds.

Bracken grassland is the northern version of prairie and is found north of the tension zone (Figure 2-2). Although similar to prairie in structure, bracken grassland is floristically very different (Curtis 1959), with bracken fern being a dominant species.

Tallgrass prairies are among the most decimated and threatened natural communities in the Midwest and the world. Of the 2.1 million acres (6% of state land area) that were native prairie when Europeans arrived 150 years ago, less than 10,000 acres of varying quality (<1 % of state land area) native prairie remains today. Most native prairies found today in Wisconsin are small remnants. Most remnants are less than 10 acres in size and very few exceed 50 acres, too small to support a full complement of species that typically inhabit a native prairie ecosystem. Most of the prairies left today are either of the wet or dry types. Mesic prairie, which was the most common type in pre-settlement days, is almost gone now, with only about 100 acres known to exist today.

Historically, native grasslands were maintained primarily by frequent fires, either started by lightening strikes or by Native Americans who burned large areas to produce food for game or to aid in hunting and gathering activities. On most soil types and moisture regimes in Wisconsin's climate, grasslands in the absence of fire, mowing, or grazing will succeed to woody species over time.

During the development of the Wisconsin Strategy for Wildlife Species of Greatest Conservation Need, the Grassland Group included the following seven community types:

- Bracken Grassland (Section 3.3.3.1, Page 3-475)
- Dry Prairie (Section 3.3.3.2, Page 3-482)
- Dry-Mesic Prairie (Section 3.3.3.3, Page 3-491)
- Mesic Prairie (Section 3.3.3.4, Page 3-500)
- Sand prairie (Section 3.3.3.5, Page 3-508)
- Wet Prairie (Section 3.3.3.6, Page 3-515)
- Wet-Mesic Prairie (Section 3.3.3.7, Page 3-521)

Summary of Vertebrate Species
of Greatest Conservation Need
Associated with Grassland
Communities

30 Birds
19 Herptiles
4 Mammals

53 Total Species

The vertebrate Species of Greatest Conservation Need in each of these communities are presented in the following sections, along with information on opportunities, threats, and priority conservation actions.

3.3.3.1 Bracken Grassland

3.3.3.1.1 Community Overview

Bracken grasslands occur in northern Wisconsin on upland sites with infertile sandy soils. These communities are dominated by bracken fern, Pennsylvania sedge, Kalm's brome grass, and Canada bluegrass. Other common herbs include poverty oat-grass, Lindley's aster, gray goldenrod, and common strawberry. Some sites have variable coverages of low shrubs such as blueberries, sweet fern, prairie willow, and hazelnuts. Exotic, non-native plants are often present on these sites and sometimes reach relatively high cover values. Not all of these exotics are invasive, however.

The origin of this type is unclear, but apparently includes an interacting mixture of topographic and edaphic conditions, past disturbance history, and perhaps some degree of allelopathy due to the abundance of one of the commonly dominant plants, bracken fern. The community is fire-dependent, was probably maintained by relatively frequent ground fires, and on some landforms is associated with low-lying frost pockets where frosts occur during the growing season. There is disagreement on whether bracken grassland should be considered a separate "natural community" in Wisconsin and elsewhere in the Upper Great Lakes region. The type shares some similarities with dry sand prairie, but because of its northerly range possesses fewer prairie species. It intergrades to pine barrens or northern dry forest, with jack pine as the dominant tree species. Physiognomically, this community can be composed mostly of herbs, shrubs (with patches of ericaceous "heath" being especially prominent), or occur as a complex mosaic of grassy or shrubby openings, interspersed with patches or "islands" of jack pine, balsam fir, northern pin oak, aspens, and cherries.

3.3.3.1.2 Vertebrate Species of Greatest Conservation Need Associated with Bracken Grassland

Twelve vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with bracken grassland (Table 3-78).

Table 3-78. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with bracken grassland communities.

<i>Species Significantly Associated with Bracken Grassland</i>
Birds
Upland Sandpiper
Brown Thrasher
Vesper Sparrow
Herptiles
Boreal Chorus Frog
Wood Turtle
Blanding's Turtle
Mammals
Gray Wolf
<i>Species Moderately Associated with Bracken Grassland</i>
Birds
Northern Harrier
Sharp-tailed Grouse
Field Sparrow
Grasshopper Sparrow
Western Meadowlark

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-78 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both bracken grassland and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of bracken grassland in each of the Ecological Landscapes (Tables 3-79 and 3-80).
- Using the analysis described above, a species was further selected if it had both a significant association with bracken grassland and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of bracken grassland. These species are shown in Figure 3-12.

Table 3-79. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with bracken grassland communities and their association with Ecological Landscapes that support bracken grassland.

Bracken Grassland Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (3)*			Herptiles (3)			Mammals (1)
	Upland Sandpiper	Brown Thrasher	Vesper Sparrow	Boreal Chorus Frog	Wood Turtle	Blanding's Turtle	Gray Wolf
MAJOR							
Northeast Sands							
IMPORTANT							
Northern Highland							

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-80. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with Bracken grassland communities and their association with Ecological Landscapes that support bracken grassland.

Bracken Grassland Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (5)*				
	Northern Harrier	Sharp-tailed Grouse	Field Sparrow	Grasshopper Sparrow	Western Meadowlark
MAJOR					
Northeast Sands					
IMPORTANT					
Northern Highland					

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Color Key




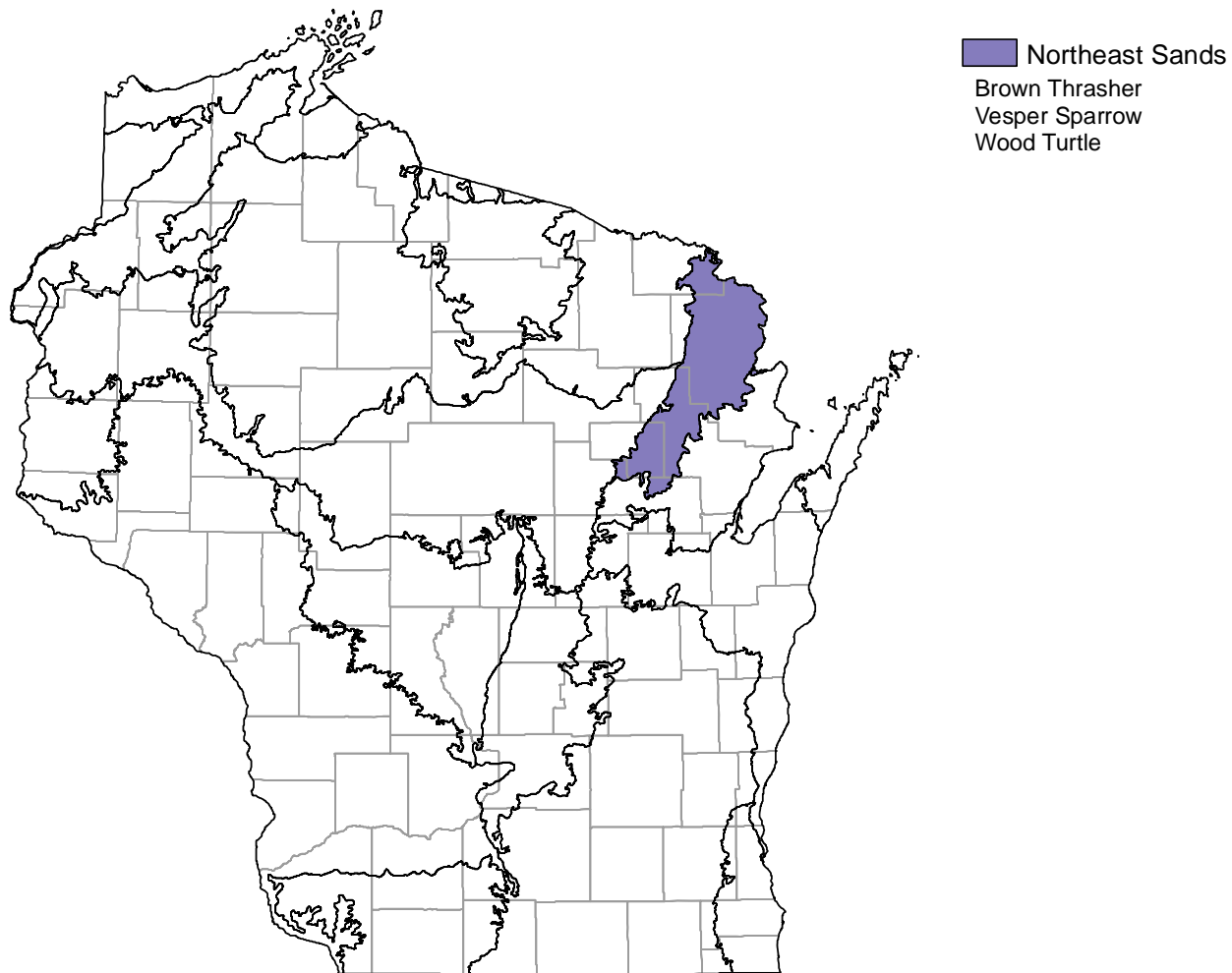
-  = HIGH probability the species occurs in this Ecological Landscape
-  = MODERATE probability the species occurs in this Ecological Landscape
-  = LOW or NO probability the species occurs in this Ecological Landscape

Figure 3-12. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with bracken grassland *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of bracken grassland.



3.3.3.1.3 Threats and Priority Conservation Actions for Bracken Grassland

3.3.3.1.3.1 Statewide Overview of Threats and Priority Conservation Actions for Bracken Grassland

The following list of threats and priority conservation actions were identified for bracken grassland in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.1.3.2 unless otherwise indicated.

Threats and Issues

- Lack of fire is a threat to bracken grasslands, allowing them to be overtaken by shrubs and eventually trees. Research is needed on the frequency and intensity of fires needed to maintain these communities.
- Afforestation to pine and, in some areas, spruce plantations is another possible threat.
- These sites are often attractive for motorized recreation, but can be easily damaged. Vehicle use on these sandy soils can destroy vegetation and expose the loose sand beneath, leading to wind erosion and requiring long time frames for revegetation to occur.
- Invasive plants such as spotted knapweed and leafy spurge can easily invade and become abundant in this community, particularly after soil disturbance.

Priority Conservation Actions

- Existing sites should be protected from afforestation and vehicle damage.
- Prescribed fire can be used to maintain the community type by limiting the growth of woody vegetation and encouraging fire-adapted species.
- Avoid soil disturbance that leads to invasive plant establishment or wind erosion, or increasing dominance of Pennsylvania sedge.
- Whether this type is considered a “natural community” or not, bracken grasslands clearly represent an important open habitat in the northernmost parts of the state. Large openings could be managed along with pine barrens or surrogate prairie grasslands (e.g., pastures, old fields, small airfields, etc.) to provide habitat for area sensitive species. Elsewhere, small openings are suitable for a variety of animals that prefer or require openings to meet habitat needs during part of their life cycle.

3.3.3.1.3.2 Additional Considerations for Bracken Grassland by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of bracken grassland exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for bracken grassland found in Section 3.3.3.1.3.1.

Additional Considerations for Bracken Grassland in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management of Bracken Grassland

Northeast Sands

Spread Eagle Barrens State Natural Area is the largest existing representative site, including pine barrens and bracken grasslands. It occupies a total of about 8,500 acres in Florence County. The land's surface features were formed by glaciation; rolling collapsed outwash plains are characteristic of Spread Eagle Barrens. Bracken grasslands occur in depressions where frosts limit the growth of woody vegetation, and pine barrens with scattered jack pines are common in other areas.

Part of Spread Eagle Barrens is owned by WDNR, and the remainder is managed under a conservation easement with WE Energies. The site supports some area-sensitive species like northern harrier and upland sandpiper, as well as birds that key in strongly on specific habitat structural features such as chestnut-sided warbler, clay-colored sparrow, and rufous-sided towhee. Restoration and management is accomplished through a combination of limited timber harvesting and prescribed burning. Non-motorized uses, such as bird watching and blueberry picking, are available to visitors.

Additional Considerations for Bracken Grassland in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management of Bracken Grassland

Northern Highland

Good examples of this unusual and poorly understood herb-dominated community occur in dry kettle depressions within pitted glacial outwash landforms that cover significant portions of this Ecological Landscape. Native herb-dominated communities are unusual on upland sites in this portion of northern Wisconsin. Only a few examples have been documented, they are all small (<100 acres), and they appear to be maintained in part by the periodic occurrence of growing season frosts that prevent or inhibit tree growth. Tree planting has been attempted and failed in these areas in the past. Maintenance of representative examples of this community type is desirable here for ecological, recreational, and aesthetic reasons.

More thorough surveys for this type on appropriate landforms in northern Wisconsin, north of the ranges of most prairie plants, could prove fruitful (e.g., at the northern extremity of the Northwest Sands Ecological Landscape in northern Bayfield County).

3.3.3.2 Dry Prairie

3.3.3.2.1 Community Overview

This dry grassland community usually occurs on steep south or west facing slopes or at the summits of river bluffs with sandstone or dolomite bedrock near the surface. Short to medium-sized prairie grasses such as little bluestem, side-oats grama, hairy grama, and prairie dropseed are the dominants in this community. Common shrubs and forbs include lead plant, silky aster, flowering spurge, purple prairie-clover, cylindrical blazing-star, and gray goldenrod. Stands on knolls in the Kettle Moraine region of southeastern Wisconsin, and on bluffs along the St. Croix River on the Minnesota-Wisconsin border, occur on gravelly substrates and may warrant recognition as distinctive subtypes of “Dry Prairie”

Because Dry Prairie occurs on sites that are not well suited to other uses, it is better represented in today's landscape than any other prairie community. It is still a relatively rare natural community that is more abundant in Wisconsin than anywhere else because of the many steep-sided bluffs in the extensive Driftless Area, the rough terrain of the kettle interlobate moraine, and the north-south orientation of several major river valleys such as the Mississippi, the Chippewa, and the St. Croix. These topographic attributes provide suitable sites for the development and persistence of this prairie type.

3.3.3.2.2 Vertebrate Species of Greatest Conservation Need Associated with Dry Prairie

Thirty-one vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with dry prairie (Table 3-81).

Table 3-81. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with dry prairie communities.

<i>Species Significantly Associated with Dry Prairie</i>
Birds
Upland Sandpiper
Field Sparrow
Vesper Sparrow
Grasshopper Sparrow
Herptiles
Wood Turtle
Blanding's Turtle
Ornate Box Turtle
Western Slender Glass Lizard
Northern Prairie Skink
Prairie Racerunner
Western Worm Snake
Yellow-bellied Racer
Prairie Ringneck Snake
Black Rat Snake
Bullsnake
Timber Rattlesnake
Eastern Massasauga Rattlesnake
Mammals
White-tailed Jackrabbit
Prairie Vole
<i>Species Moderately Associated with Dry Prairie</i>
Birds
Northern Harrier
Greater Prairie-chicken
Sharp-tailed Grouse
Northern Bobwhite
Barn Owl
Short-eared Owl
Brown Thrasher
Loggerhead Shrike
Bell's Vireo
Lark Sparrow
Eastern Meadowlark
Western Meadowlark

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-81 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both dry prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of dry prairie in each of the Ecological Landscapes (Tables 3-82 and 3-83).

- Using the analysis described above, a species was further selected if it had both a significant association with dry prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry prairie. These species are shown in Figure 3-13.

Table 3-82. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with dry prairie communities and their association with Ecological Landscapes that support dry prairie.

Dry Prairie	Birds (4)*				Herptiles (13)													Mammals (2)	
	Upland Sandpiper	Field Sparrow	Vesper Sparrow	Grasshopper Sparrow	Wood Turtle	Blanding's Turtle	Ornate Box Turtle	Western Slender Glass Lizard	Northern Prairie Skink	Prairie Racerunner	Western Worm Snake	Yellow-bellied Racer	Prairie Ringneck Snake	Black Rat Snake	Bullsnake	Timber Rattlesnake	Eastern Massasauga Rattlesnake	White-tailed Jackrabbit	Prairie Vole
MAJOR																			
Southeast Glacial Plains																			
Southwest Savanna																			
Western Coulee and Ridges																			
IMPORTANT																			
Central Sand Hills																			
Central Sand Plains																			
Western Prairie																			

Color Key

 = HIGH probability the species occurs in this Ecological Landscape
 = MODERATE probability the species occurs in this Ecological Landscape
 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-83. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with dry prairie communities and their association with Ecological Landscapes that support dry prairie.

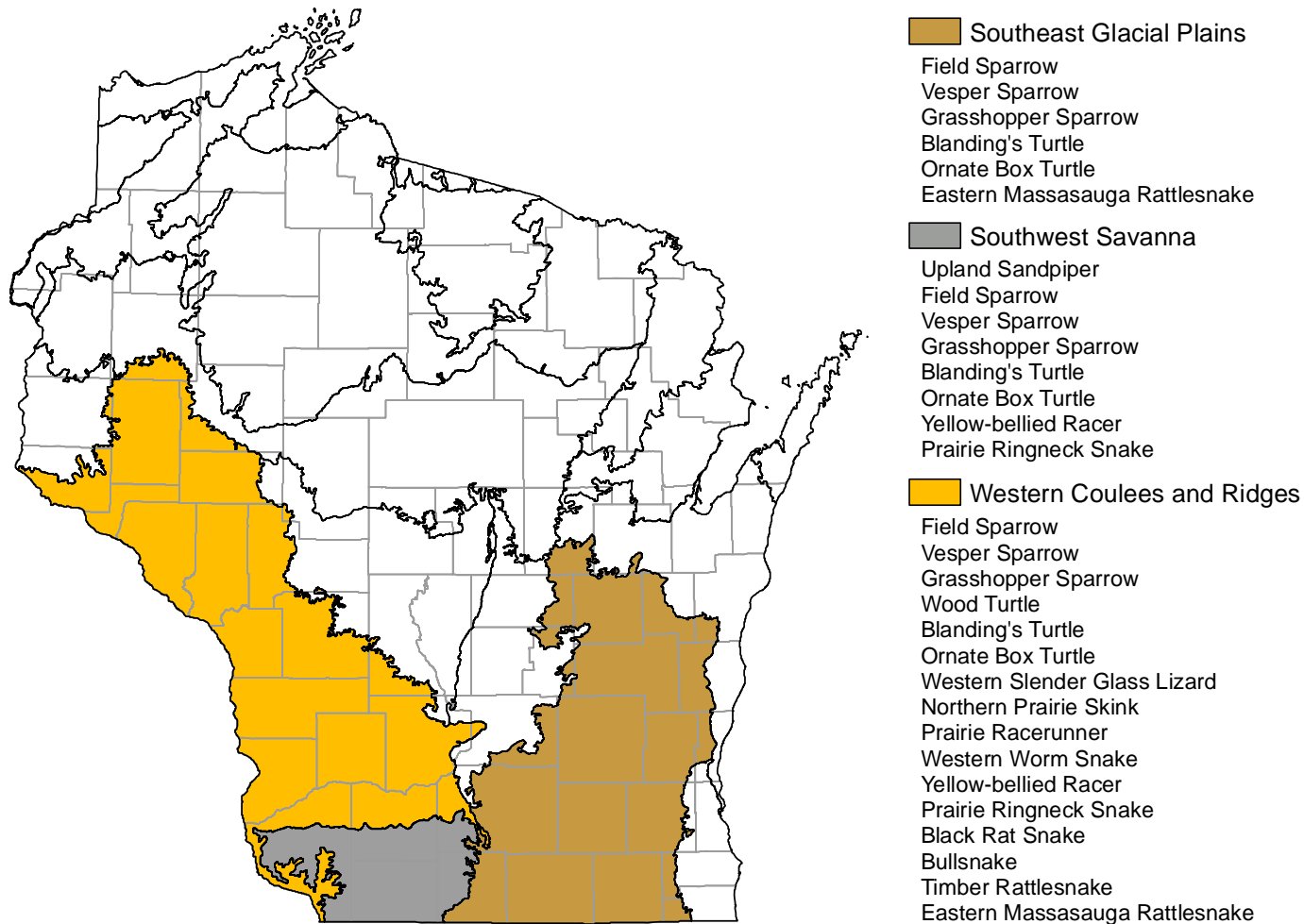
Dry Prairie	Birds (12)*											
	Northern Harrier	Greater Prairie-Chicken	Sharp-tailed Grouse	Northern Bobwhite	Barn Owl	Short-eared Owl	Brown Thrasher	Loggerhead Shrike	Bell's Vireo	Lark Sparrow	Eastern Meadowlark	Western Meadowlark
MAJOR												
Southeast Glacial Plains												
Southwest Savanna												
Western Coulee and Ridges												
IMPORTANT												
Central Sand Hills												
Central Sand Plains												
Western Prairie												

Color Key

 = HIGH probability the species occurs in this Ecological Landscape
 = MODERATE probability the species occurs in this Ecological Landscape
 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-13. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with dry prairie *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry prairie.



3.3.3.2.3 Threats and Priority Conservation Actions for Dry Prairie

3.3.3.2.3.1 Statewide Overview of Threats and Priority Conservation Actions for Dry Prairie

The following list of threats and priority conservation actions were identified for dry prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.2.3.2 unless otherwise indicated.

Threats and Issues

- Many remnant prairies exist along the bluffs of large rivers in southwestern Wisconsin; however, most sites are small and isolated. It can be very difficult, and expensive, to manage small sites, especially on these steep slopes.
- Special care is needed to managing for some of the fire sensitive invertebrates and herptiles, but this complicates the management of vegetation. Genetic diversity of prairie species on these small, isolated patches may be declining, along with species diversity.
- Lack of fire is a problem.
- Non-native invasives are a problem out-competing native species (e.g., non-native grasses, spotted knapweed, crown vetch, and leafy spurge).
- Aggressive native plants can also lead to habitat conversion (e.g., smooth sumac, black walnut).
- Succession of open prairie to red cedar thickets can be a problem.
- Grazing is not common in this type, but can cause community simplification, encourage the expansion of invasive plants, and contribute to erosion.
- Urban expansion is occurring in some locations, especially around larger cities. Hilltop housing developments can impact prairie remnants and limit the opportunity to manage with prescribed fire. Lack of land use planning that protects bluff lands limits opportunities to manage or restore this community type.
- Conflicts sometimes exist with forest management objectives.

Priority Conservation Actions

- Preserve and manage large sites where they exist.
- Connect and buffer sites where possible. Use a “stepping stone” approach to designing conservation sites where it is not possible to enlarge or connect disjunct prairie patches.
- Use prescribed fire, brushing, and other tools to restore overgrown sites.
- Where possible, manage in a complex of savanna, surrogate grasslands, other prairie types, and/or oak forest.
- Promote private management (e.g., via the Prairie Enthusiasts) of small sites where possible, and provide funding and technical resources to landowners who wish to restore remnants or reconstruct prairies on former farmland, especially in landscapes where there are native prairie remnants or extensive Conservation Reserve Program lands.
- Develop incentives to preserve or restore this community type.
- Follow existing management guidelines for prescribed burning to minimize impacts on sensitive species.
- Develop educational tools and demonstration areas that promote benefits of prescribed fire, and address liability concerns.
- Grazing should be discouraged. Develop incentives to limit grazing on native prairie.
- Maintain connectivity for reptiles and invertebrates where possible.
- Continue and support research to identify and develop biocontrols for invasives; control spread of new invasives.

- More detailed floristic studies of dry prairies outside of the Driftless Area are needed to resolve questions regarding the variability associated with this type, and to better determine conservation priorities.

3.3.3.2.3.2 Additional Considerations for Dry Prairie by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of dry prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for dry prairie found in Section 3.3.3.2.3.1.

Additional Considerations for Dry Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Southeast Glacial Plains

The dry prairie type is of limited extent in this Ecological Landscape, but locally common in the South Unit of the Kettle Moraine State Forest on steep slopes of south or west-facing morainal ridges. The substrate consists of glacially deposited sands and gravels. Most prairies here are small and overgrown, but some sites are now being managed with prescribed fire, brushing, and herbicides. Many sites were historically small and restricted due to topographic position, where they intergraded with other prairie types and oak openings. Larger sites should be preserved where they exist. Opportunities for restoration exist, and these may be less labor-intensive than for tallgrass types. Additional development on and around restorable sites should be limited, especially where that would conflict with the need to use prescribed fire or other active management tools. More information should be gathered to document differences of the prairies on glacial moraine from those on Driftless Area bluffs. Sites should also be monitored to determine whether management is maintaining native diversity.

Southwest Savanna

The dry prairie type is limited in extent in this Ecological Landscape and restricted mostly to steep slopes on bluffs (e.g., bluff prairies and goat prairies). Large unplowed pastures are present in some parts of this Ecological Landscape that could be restored to native grasslands. Urban expansion is occurring in some locations and can impact prairie remnants and limit the opportunity to manage with prescribed fire. Examples are found at Thomson Prairie and Barneveld Prairie Preserves (Iowa County), and Yellowstone Savanna and Hardscrabble Prairie State Natural Areas (Lafayette County).

Western Coulees and Ridges

This Ecological Landscape represents the best opportunity in the state (and perhaps in the upper Midwest) for conservation of this community. The type is found on steep slopes on bluffs (and have often been called “bluff prairies”, “goat prairies”, or “dry lime prairies”). Patch sizes are typically small, but there are many extant occurrences. Examples of this type are found at Battle Bluff Prairie (Vernon County), Rush Creek (Crawford County), Trenton Bluff Prairie (Pierce County), Gasner Hollow Prairie (Grant County), and Morgan Coulee Prairie (Pierce County) State Natural Areas.

Additional Considerations for Dry Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Central Sand Hills

This type is not well represented in this Ecological Landscape. Sites should be preserved where they exist. The best example is found at Hawk Hill (Dane County). Other dry prairies here should be classified as "Sand Prairie".

Central Sand Plains

This type is not well represented in the Ecological Landscape and is associated with steep slopes on sandstone ridges. Sites should be preserved where they exist. Examples are found at Brooks Bluff (Adams County), Round Bluff, Townline Bluff, and Twin Teton Bluffs (all in Juneau County).

Western Prairie

Dry prairie is of limited extent in the Ecological Landscape, occurring mostly on steep west-facing slopes on bluffs of the St. Croix River and some of its tributaries, and in a few sandy-soiled areas elsewhere. Patch sizes are typically small with a few existing and potential sites. Past grazing has led to degradation of many sites. Urban expansion is occurring throughout the Ecological Landscape and existing sites should be preserved. Examples of dry prairie occur at Apple River Canyon State Natural Area and at Willow River State Park (St. Croix County), and as small patches on bluffs with south or west aspects in the Kinnickinnic River Valley (Pierce County).

3.3.3.3 Dry-Mesic Prairie

3.3.3.3.1 Community Overview

Historically, this grassland community was common in parts of southern Wisconsin, occurring on slightly less droughty sites than dry prairie. Today, this community type is rare because of conversion to agricultural uses or the encroachment of woody vegetation due to the lack of wildfire. Dry-mesic prairie has many of the same grasses as dry prairie, but taller species such as big bluestem and Indian-grass dominate. Needle grass and prairie drop-seed may also be present. The herb component is more diverse than in dry prairies, as it may include many species that occur in both dry and mesic prairies. Composites and legumes are particularly well-represented in relatively undisturbed stands.

Soils are often somewhat sandy, either loamy sands or sandy loams. The landscape associations that can support this type include terraces on the margins of large river valleys, sandy outwash deposits, gravelly moraines, and the lower slopes of Driftless Area bluffs. As with the other tallgrass prairie communities (mesic prairie and wet-mesic prairie), well over 99% of this prairie type has been destroyed.

3.3.3.3.2 Vertebrate Species of Greatest Conservation Need Associated with Dry-Mesic Prairie

Thirty-nine vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with dry-mesic prairie (Table 3-84).

Table 3-84. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with dry-mesic prairie communities.

<i>Species Significantly Associated with Dry-Mesic Prairie</i>
Birds
Greater Prairie-chicken
Upland Sandpiper
Barn Owl
Dickcissel
Grasshopper Sparrow
Henslow's Sparrow
Bobolink
Eastern Meadowlark
Western Meadowlark
Herptiles
Western Slender Glass Lizard
Prairie Ringneck Snake
Bullsnake
Butler's Garter Snake
Eastern Massasauga Rattlesnake
Mammals
White-tailed Jackrabbit
Franklin's Ground Squirrel
Prairie Vole
<i>Species Moderately Associated with Dry-Mesic Prairie</i>
Birds
Blue-winged Teal
Northern Harrier
Sharp-tailed Grouse
Northern Bobwhite
American Golden Plover
Marbled Godwit
Buff-breasted Sandpiper
Short-eared Owl
Willow Flycatcher
Brown Thrasher
Loggerhead Shrike
Bell's Vireo
Field Sparrow
Vesper Sparrow
Herptiles
Wood Turtle
Blanding's Turtle
Ornate Box Turtle
Northern Prairie Skink
Yellow-bellied Racer
Black Rat Snake
Western Ribbon Snake
Timber Rattlesnake

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-84 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both dry-mesic prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of dry-mesic prairie in each of the Ecological Landscapes (Tables 3-85 and 3-86).
- Using the analysis described above, a species was further selected if it had both a significant association with dry-mesic prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry-mesic prairie. These species are shown in Figure 3-14.

Table 3-85. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with dry-mesic prairie communities and their association with Ecological Landscapes that support dry-mesic prairie.

Dry-Mesic Prairie	Birds (9)*									Herptiles (5)					Mammals (3)		
	Greater Prairie-chicken	Upland Sandpiper	Barn Owl	Dickcissel	Grasshopper Sparrow	Henslow's Sparrow	Bobolink	Eastern Meadowlark	Western Meadowlark	Western Slender Glass Lizard	Prairie Ringneck Snake	Bullsnake	Butler's Garter Snake	Eastern Massasauga Rattlesnake	White-tailed Jackrabbit	Franklin's Ground Squirrel	Prairie Vole
MAJOR																	
Southeast Glacial Plains																	
Southwest Savanna																	
Western Coulee and Ridges																	
IMPORTANT																	
Central Sand Plains																	
Western Prairie																	
PRESENT (MINOR)																	
Central Sand Hills																	
Southern Lake Michigan Coastal																	

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

Table 3-86. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with dry-mesic prairie communities and their association with Ecological Landscapes that support dry-mesic prairie.

Dry-Mesic Prairie	Birds (14)*														Herptiles (8)							
	Blue-winged Teal	Northern Harrier	Sharp-tailed Grouse	Northern Bobwhite	American Golden Plover	Marbled Godwit	Buff-breasted Sandpiper	Short-eared Owl	Willow Flycatcher	Brown Thrasher	Loggerhead Shrike	Bell's Vireo	Field Sparrow	Vesper Sparrow	Wood Turtle	Blanding's Turtle	Ornate Box Turtle	Northern Prairie Skink	Yellow-bellied Racer	Black Rat Snake	Western Ribbon Snake	Timber Rattlesnake
MAJOR																						
Southeast Glacial Plains																						
Southwest Savanna																						
Western Coulee and Ridges																						
IMPORTANT																						
Central Sand Plains																						
Western Prairie																						
PRESENT (MINOR)																						
Central Sand Hills																						
Southern Lake Michigan Coastal																						

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

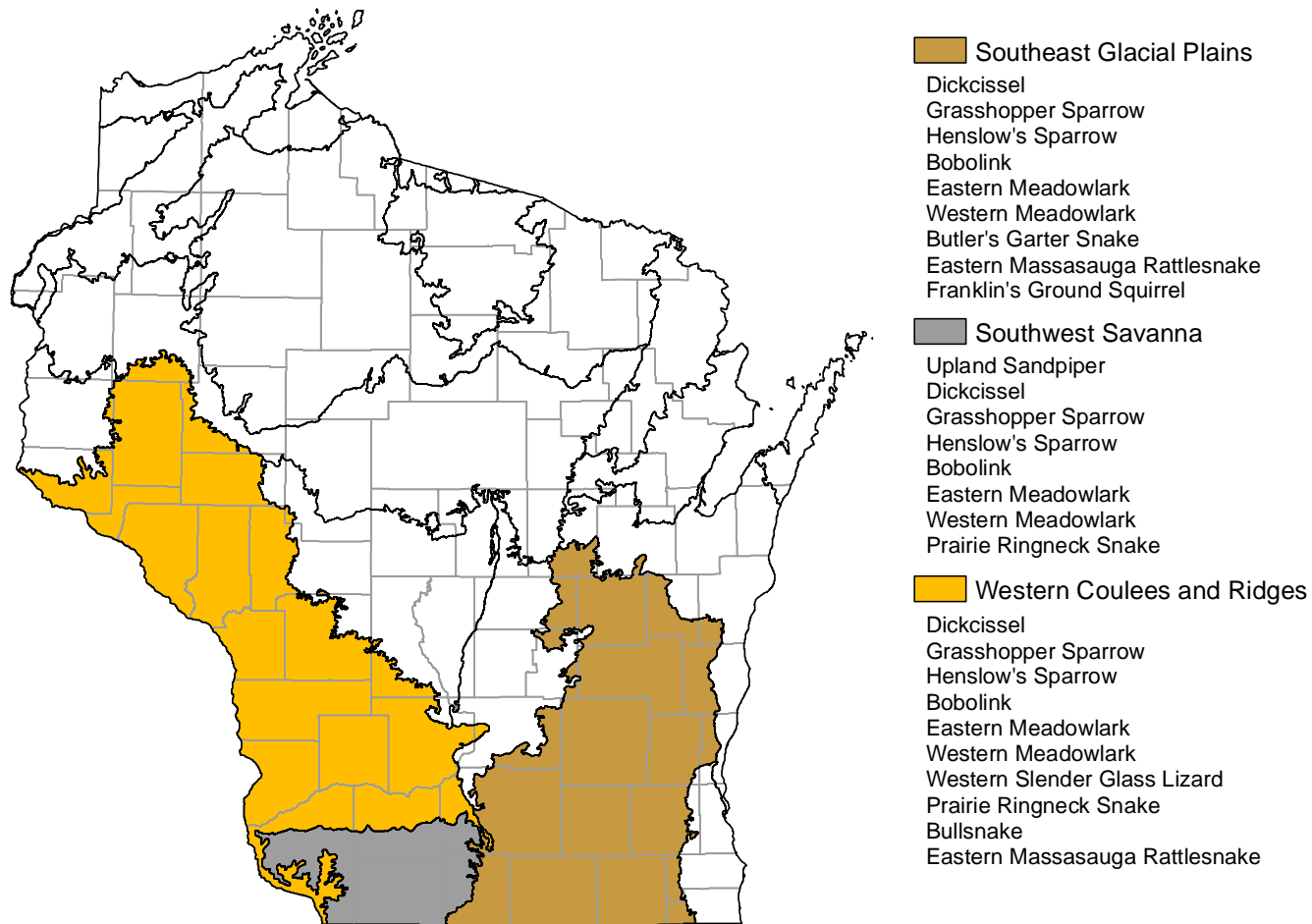
Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

Figure 3-14. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with dry-mesic prairie *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of dry-mesic prairie.



3.3.3.3.3 Threats and Priority Conservation Actions for Dry-Mesic Prairie

3.3.3.3.3.1 Statewide Overview of Threats and Priority Conservation Actions for Dry-Mesic Prairie

The following list of threats and priority conservation actions were identified for dry-mesic prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.3.3.2 unless otherwise indicated.

Threats and Issues

- Most remnants are small and isolated, and often restricted to narrow rights-of-way, which can make management difficult.
- Managing for fire-sensitive invertebrates is needed but that can complicate vegetation management. Lack of fire is a problem because of the encroachment of woody plants and spread of invasive species.
- Invasive plants are a problem when they out-compete native species. Among the serious weeds in this type are non-native grasses such as smooth brome, Kentucky bluegrass, and Canada bluegrass, and other forbs including crown vetch, spotted knapweed, sweet clovers, and wild parsnip.
- Vegetation diversity may be declining at both the species and genetic levels.
- Grazing can cause simplification by reducing the abundance and diversity of native plants and encouraging the expansion of invasive plants.
- Housing developments and urban expansion can limit the opportunity to manage with prescribed fire and contribute to isolation effects.
- More information is needed to manage the natural variability of the community type.
- Conflicts sometimes exist between forest or grassland objectives.
- Where this type is limited to rights-of-way between agricultural fields, herbicide drift, or sometimes the direct application of herbicides to the right-of-way, can be a serious threat.

Priority Conservation Actions

- Manage in a complex of other prairie types, surrogate grasslands, savanna, or oak forest.
- Preserve large grassland sites wherever they exist, and protect prairie remnants within these large sites.
- Limit additional development on and around restorable sites and areas where connectivity between remnants could be feasible by acquisition, conservation easements, providing landowner incentives, or other means.
- Restoration of overgrown sites is needed.
- Promote private management (e.g., Prairie Enthusiasts) of small sites where possible, and encourage landowners who wish to reconstruct/restore prairies in appropriate landscapes on former farmland.
- Develop and offer incentives to preserve, manage, or restore this community type.
- Develop educational tools and demonstration areas that promote the benefits and safe use of prescribed fire, and address liability concerns.
- Follow existing management guidelines or screening guidance for prescribed burning to minimize negative impacts on sensitive species.
- Grazing may not be appropriate in high-quality remnants as they are fragile, and grazing typically increases non-native flora at the expense of the natives.
- In surrogate prairie grasslands around remnants, grazing can be used judiciously at certain times to accommodate some grassland birds. Care should be taken not to eliminate palatable native plants, if any. More information is needed on proper cattle stocking density and timing of grazing to prevent loss of sensitive plants and disruption of nesting birds.

- Maintain connectivity among sites for mammals, birds, reptiles and invertebrates where possible.
- Continue and support research to find biocontrols for invasives; control spread of new invasives.
- Monitor prairie and grassland sites to determine whether management is maintaining native diversity.

3.3.3.3.2 Additional Considerations for Dry-Mesic Prairie by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of dry-mesic prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for dry-mesic prairie found in Section 3.3.3.3.1.

Additional Considerations for Dry-Mesic Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Southeast Glacial Plains

Historically common in this Ecological Landscape, the type is now very limited in extent, but there are more opportunities here than in most other Ecological Landscapes. The relatively flat topography of the Ecological Landscape led to extensive conversion of prairie to agriculture. Areas that are sandy, relatively infertile, steeply sloping, or where bedrock is near the surface, were less likely to have been plowed. Such sites are where most remnants are found. Most examples are along the southeastern edge of the Ecological Landscape near the relatively rugged Kettle Moraine, and in the southernmost portion of the Ecological Landscape that was not glaciated during the Wisconsin Ice Age. Elsewhere, most of the remnants are restricted to rights-of-way. Urban expansion is occurring in some locations, especially near larger cities, and can further impact prairie remnants and limit the opportunity to manage with prescribed fire.

Many dry-mesic prairie remnants exist, however acreage is not extensive (e.g., Westport Drumlin Prairie (Dane County), Arlington Prairie and Hawk Hill (Columbia County), Muralt Bluff Prairie and Oliver Prairie (Green County)). Most of the high-quality remnants are being protected and managed appropriately. Opportunities to connect remnants and expand grasslands that can be managed compatibly with prairies should be sought. Grazing is not occurring on the quality remnants at this time.

Southwest Savanna

Historically common in this Ecological Landscape, the type is now limited in extent. Conversion to agriculture has occurred throughout the Ecological Landscape, but there are important opportunities for restoration in large acreages of pasture that have never been plowed. Methods of grazing that are compatible with grassland management objectives should be studied and developed. Large-scale prescribed burning, or other means of reducing woody vegetation or weeds, may be needed. Urban expansion is occurring in some locations and can impact prairie remnants and limit the opportunity to manage with prescribed fire. Underwood Prairie (Iowa County), Mud Branch Prairie (Lafayette County), and Green's Cemetery Prairie (Green County) are examples of this type.

Western Coulees and Ridges

Historically common in this Ecological Landscape, the type is now limited in extent. It is occasionally found on wider ridge tops, below dry prairies on lower hill slopes, and on terraces along larger rivers. The flatter topography where this community type occurred was more extensively converted to agriculture and residential development, but there are still important opportunities for restoration. Urban expansion is occurring in locations around larger cities. Examples of this type are found at Black Earth Prairie State

Natural Area (Dane County), Avoca Prairie State Natural Area (Iowa County), Midway Railroad Prairie State Natural Area (La Crosse County), La Crosse River Trail Prairie State Natural Area (Monroe County), and Snake Bluff (Juneau County).

Additional Considerations for Dry-Mesic Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Central Sand Plains

The type is very rare in the Ecological Landscape. Most of the few occurrences that have been documented are in rights-of-way, and have been seriously degraded by the encroachment of woody plants and colonization by invasive weeds. There may be limited opportunities for restoration and expansion in this Ecological Landscape, but the priority and feasibility of these have not been adequately assessed. An example is found at Mill Bluff State Park (Juneau County).

Western Prairie

The type is extremely rare in the Ecological Landscape because of the almost total conversion of prairie to agricultural uses. Urban expansion is occurring and increasing rapidly throughout the Ecological Landscape. A few sites on Waterfowl Production Areas are suited for restoration. Examples are found at Bass Lake Prairie, Ulrich Prairie, and Ogburns Prairie (St. Croix County).

3.3.3.4 Mesic Prairie

3.3.3.4.1 Community Overview

Although common historically, this type is extremely rare today. This grassland community occurs on rich, moist, well-drained sites, usually on level or gently rolling glacial topography. The dominant plant is the tall grass, big bluestem. The grasses little bluestem, Indian grass, needle grass, prairie dropseed, and switch grass are also frequent. The forb layer is diverse in the number, size, and physiognomy of the species. Common taxa include the prairie docks, lead plant, heath and smooth asters, prairie coreopsis, prairie sunflower, rattlesnake-master, flowering spurge, bee-balm, prairie coneflower, and spiderwort.

At the time of European settlement it is estimated that this type occupied over 800,000 acres in southern Wisconsin. Today one would be hard pressed to make the case that even 100 acres of intact tallgrass prairie still exists. The present rarity of this type is due to its high productivity for agricultural uses, such as corn and soybean production. It was associated with other tallgrass prairie communities, various wetland types, and oak openings.

3.3.3.4.2 Vertebrate Species of Greatest Conservation Need Associated with Mesic Prairie

Twenty-five vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with mesic prairie (Table 3-87).

Table 3-87. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with mesic prairie communities.

<i>Species Significantly Associated with Mesic Prairie</i>	
Birds	
Northern Harrier	
Greater Prairie-chicken	
Barn Owl	
Short-eared Owl	
Dickcissel	
Henslow's Sparrow	
Bobolink	
Eastern Meadowlark	
Herptiles	
Butler's Garter Snake	
Eastern Massasauga Rattlesnake	
<i>Species Moderately Associated with Mesic Prairie</i>	
Birds	
Blue-winged Teal	
Northern Bobwhite	
American Golden Plover	
Upland Sandpiper	
Marbled Godwit	
Willow Flycatcher	
Field Sparrow	
Herptiles	
Pickerel Frog	
Blanding's Turtle	
Black Rat Snake	
Bullsnake	
Western Ribbon Snake	
Timber Rattlesnake	
Mammals	
Franklin's Ground Squirrel	
Prairie Vole	


In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-87 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both mesic prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:


- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of mesic prairie in each of the Ecological Landscapes (Tables 3-88 and 3-89).
- Using the analysis described above, a species was further selected if it had both a significant association with mesic prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of mesic prairie. These species are shown in Figure 3-15.


Table 3-88. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with mesic prairie communities and their association with Ecological Landscapes that support mesic prairie.

Mesic Prairie Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (8)*								Herptiles (2)	
	Northern Harrier	Greater Prairie-Chicken	Barn Owl	Short-eared Owl	Dickcissel	Henslow's Sparrow	Bobolink	Eastern Meadowlark	Butler's Garter Snake	Eastern Massasauga Rattlesnake
MAJOR										
Southeast Glacial Plains										
Southwest Savanna										
Western Prairie										
IMPORTANT										
Southern Lake Michigan Coastal										
Western Coulee and Ridges										
PRESENT (MINOR)										
Central Sand Hills										
Central Sand Plains										

Color Key

 = HIGH probability the species occurs in this Ecological Landscape

 = MODERATE probability the species occurs in this Ecological Landscape

 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-89. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with mesic prairie communities and their association with Ecological Landscapes that support mesic prairie.

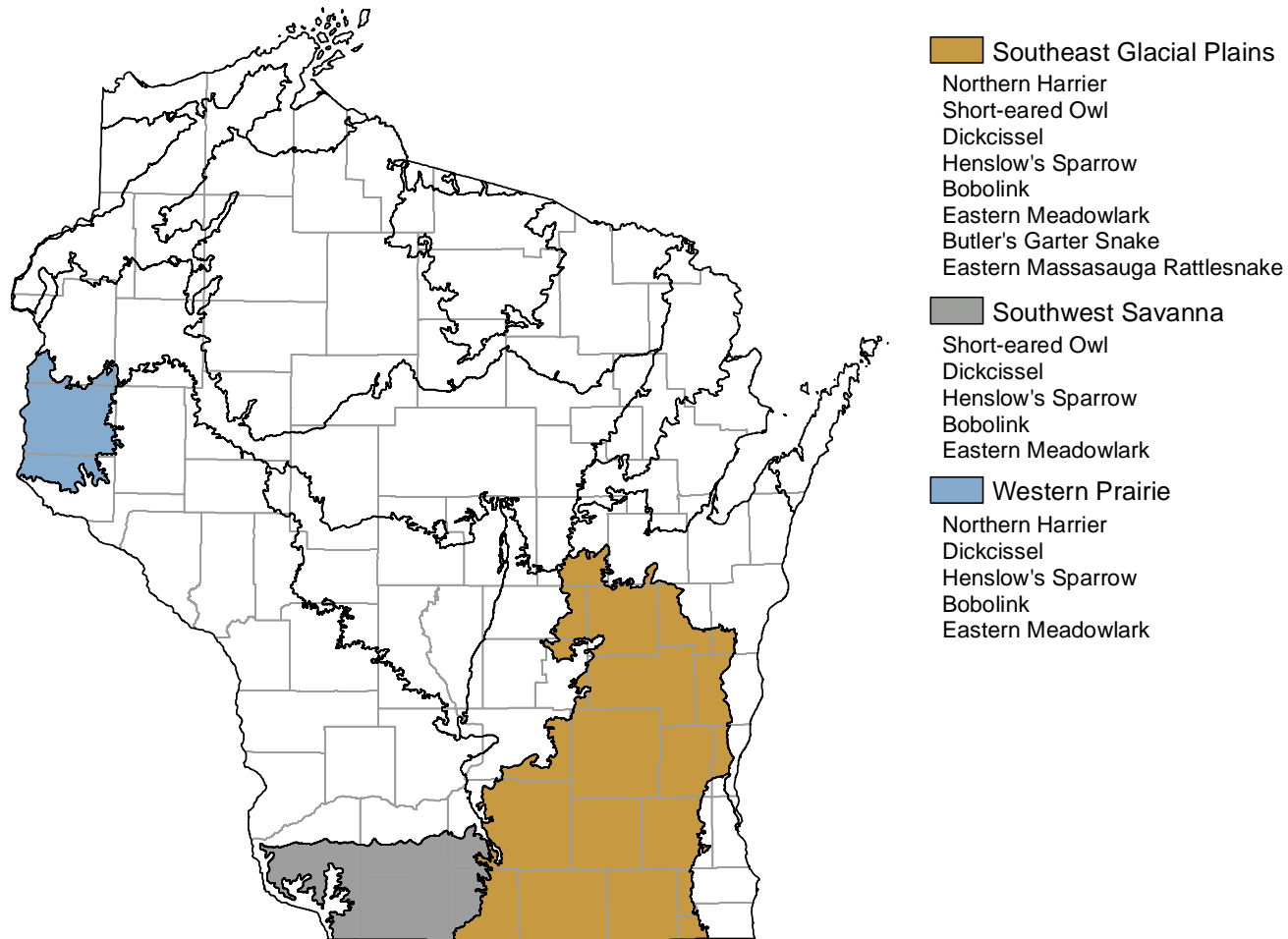
Mesic Prairie	Birds (7)*							Herptiles (6)						Mammals (2)	
	Blue-winged Teal	Northern Bobwhite	American Golden Plover	Upland Sandpiper	Marbled Godwit	Willow Flycatcher	Field Sparrow	Pickereel Frog	Blanding's Turtle	Black Rat Snake	Bullsnake	Western Ribbon Snake	Timber Rattlesnake	Franklin's Ground Squirrel	Prairie Vole
MAJOR															
Southeast Glacial Plains															
Southwest Savanna															
Western Prairie															
IMPORTANT															
Southern Lake Michigan Coastal															
Western Coulee and Ridges															
PRESENT (MINOR)															
Central Sand Hills															
Central Sand Plains															

Color Key

 = HIGH probability the species occurs in this Ecological Landscape
 = MODERATE probability the species occurs in this Ecological Landscape
 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-15. Vertebrate Species of Greatest Conservation Need that have both a significant association with mesic prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of mesic prairie.



3.3.3.4.3 Threats and Priority Conservation Actions for Mesic Prairie

3.3.3.4.3.1 Statewide Overview of Threats and Priority Conservation Actions for Mesic Prairie

The following list of threats and priority conservation actions were identified for mesic prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.4.3.2 unless otherwise indicated.

Threats and Issues

- Very few examples of this type exist today. Most mesic prairies were converted to agricultural uses.
- Most remnants are small and isolated, and can be difficult to manage. Managing for fire-sensitive invertebrates is needed but complicates management of the fire-dependent vegetation, especially on small sites.
- Genetic and species diversity of mesic prairie plants and animals may be declining because of small population size and population isolation.
- Lack of fire and encroachment by woody species and weeds is a problem.
- Housing developments and urban expansion can limit the opportunity to manage with prescribed fire or reconnect sites. Lack of land use planning limits opportunities to manage or restore this community type.
- Past grazing has degraded many sites. Grazing can cause simplification and encourage the expansion of invasive plants.
- Invasives are a problem and out-compete native species. Problem species include non-native grasses such as smooth brome, Kentucky bluegrass, Canada bluegrass, crown vetch, sweet clover, wild parsnip, multiflora rose, and Eurasian honeysuckles.
- Remnants that occur within rights-of-way are especially vulnerable to disturbance or destruction. Rights-of-way prairies are often mowed, graded, sprayed or used as places to dispose of junk or on which to “store” waste materials.
- In agricultural areas herbicide drift can be a problem.
- In more residential areas, off-road vehicle use has damaged many prairies.
- Restoration is often difficult to achieve due to lack of funds and limited species composition in “restoration” sites.

Priority Conservation Actions

- Restoration is required for this community type to ensure that it is adequately represented in our future landscapes.
- Preserve, buffer, and enlarge existing sites where they exist. Manage and conduct restorations as a complex with other grassland and wetland types.
- Promote private management (e.g., via the Prairie Enthusiasts) of small sites where possible.
- Offer incentives to preserve or restore this community type, including incentives to limit grazing.
- Develop educational tools and demonstration areas that promote understanding of prairies, the benefits of prescribed fire, and address liability concerns and questions.
- Follow existing management guidelines for prescribed burning to minimize impacts on sensitive species. Consider needs of fire-sensitive invertebrates and other species when burning, and burn only part of each site in each burn.
- Maintain and establish connectivity where possible.
- Monitor these sites to determine whether management is maintaining native diversity.
- Continue and support research to find biocontrols for invasives; control spread of new invasives.

3.3.3.4.3.2 Additional Considerations for Mesic Prairie by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of mesic prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for mesic prairie found in Section 3.3.3.4.3.1.

Additional Considerations for Mesic Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Southeast Glacial Plains

Relatively few remnants exist (e.g., Westport Drumlins on the north side of knolls (Dane County), Arlington Prairie (Columbia County), Empire Prairie, White River Marsh Wildlife Area (Green Lake County), and Sugar River Trail Prairie (Green County)). Most remnants are small and isolated. Prairie inventories are needed for sites near Madison in the southwest portion of the Ecological Landscape and around the southern portion of the Kettle Moraine. A few additional remnants occur in the Lake Winnebago area, in railroad rights-of-way, but structure is often altered and species diversity is diminished. Several very small occurrences have been documented in railroad rights-of-way in and around Horicon Marsh. Additional inventory may be needed in the northern part of the Ecological Landscape (Fond du Lac and Winnebago Counties). Some sites are impacted by herbicides from both ground and aerial applications.

Southwest Savanna

Few occurrences exist in this Ecological Landscape today, and most of them are small and isolated. There are, however, some good restoration opportunities, or opportunities to manage remnants within large acreages of surrogate prairie grassland within generally open landscapes. Examples include Ipswich Prairie State Natural Area (Grant and Lafayette counties), the Military Ridge Prairie Heritage Area (Iowa County), the Highway 39 Grasslands (Green County), Belmont Prairie (Lafayette County), and Stony Creek Prairie (Iowa County).

Western Prairie

Historically, this Ecological Landscape was a major area for tallgrass prairie communities, including mesic prairie on the uplands. This is the only landscape in Wisconsin where prairie potholes were characteristic landscape features. Very few remnants remain. In most areas, the land was plowed right down to the edge of the potholes. The few existing remnants, all of which are small should be preserved and buffered with compatible community types such as surrogate prairie grassland. Potholes should also be incorporated into these complexes. Large-scale construction/restoration of sites is needed. Grassland sites in this landscape should be surveyed and assessed to identify unplowed areas of former prairie with high restoration potential.

Examples of mesic prairie include Roberts Railroad Prairie and the Hammond Cemetery Prairie (both in St. Croix County). The best restoration opportunities are probably associated with the state and federal waterfowl production areas, where there is good potential to manage complexes made up of ponds, lakes, wetlands, and surrogate grasslands.

Additional Considerations for Mesic Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Southern Lake Michigan Coastal

Remaining sites should be preserved where they exist (e.g., remnants at Bong Recreation Area, and limited parts of Chiwaukee Prairie Preserve in Kenosha County). Other examples are found at Kansasville Railroad Prairie and Sturtevant Mesic Prairie (Racine County) and Benedict Prairie (Kenosha County). These occurrences are all small and most occur within rights-of-way, where they are highly vulnerable to inadvertent damage or destruction.

Western Coulees and Ridges

All sites are small and isolated. Past conversion to agriculture has impacted virtually all former mesic prairie in this Ecological Landscape. A few small, degraded examples of this type still exist. There is some potential that additional inventory efforts could yield undiscovered remnants, but none of these would be large. Restoration opportunities should focus on areas where there are extensive surrogate prairie grasslands, other prairie or savanna remnants, or areas where open wetlands are common.

3.3.3.5 Sand Prairie

3.3.3.5.1 Community Overview

Sand prairie is a dry native grassland community dominated by grasses such as little bluestem, J junegrass, panic grasses, and poverty-oat grass. Common herbaceous associates are sand cress, field sage-wort, western ragweed, several sedges (e.g., *Carex muhlenbergii*, *Cyperus filiculmis*, and *Cyperus schweinitzii*), flowering spurge, frostweed, round-headed bush-clover, western sunflower, false-heather, long-bearded hawkweed, stiff goldenrod, horsebalm, and spiderwort. Drought-adapted fungi, lichens, and mosses are significant components of sand prairie communities.

At least some stands classified as sand prairie are oak or pine barrens remnants that now lack appreciable woody cover. Extensive stands may have occurred historically on broad sand terraces bordering the Mississippi, Wisconsin, Black, and Chippewa Rivers. Sand prairie may be more prevalent now in some areas than it was in historical times. Failed attempts to farm many of these prairies created blowouts, and may have even reactivated small dunes once the prairie sod was removed. We have included the 'sand barrens' community described by Curtis (1959) with this type.

3.3.3.5.2 Vertebrate Species of Greatest Conservation Need Associated with Sand Prairie

Twenty-four vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with sand prairie (Table 3-90).

Table 3-90. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with sand prairie communities.

<i>Species Significantly Associated with Sand Prairie</i>
Birds
Brown Thrasher
Field Sparrow
Vesper Sparrow
Lark Sparrow
Grasshopper Sparrow
Herptiles
Wood Turtle
Blanding's Turtle
Ornate Box Turtle
Western Slender Glass Lizard
Northern Prairie Skink
Prairie Racerunner
Yellow-bellied Racer
Bullsnake
Timber Rattlesnake
Eastern Massasauga Rattlesnake
Mammals
White-tailed Jackrabbit
Franklin's Ground Squirrel
Prairie Vole
<i>Species Moderately Associated with Sand Prairie</i>
Birds
Upland Sandpiper
Loggerhead Shrike
Bell's Vireo
Eastern Meadowlark
Western Meadowlark
Herptiles
Prairie Ringneck Snake

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-90 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both sand prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of sand prairie in each of the Ecological Landscapes (Tables 3-91 and 3-92).
- Using the analysis described above, a species was further selected if it had both a significant association with sand prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of sand prairie. These species are shown in Figure 3-16.

Table 3-91. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with sand prairie communities and their association with Ecological Landscapes that support sand prairie.

Sand Prairie	Birds (5)*					Herptiles (10)										Mammals (3)		
	Brown Thrasher	Field Sparrow	Vesper Sparrow	Lark Sparrow	Grasshopper Sparrow	Wood Turtle	Blanding's Turtle	Ornate Box Turtle	Western Slender Glass Lizard	Northern Prairie Skink	Prairie Racerunner	Yellow-bellied Racer	Bullsnake	Timber Rattlesnake	Eastern Massasauga Rattlesnake	White-tailed Jackrabbit	Franklin's Ground Squirrel	Prairie Vole
MAJOR																		
Central Sand Plains																		
Western Coulee and Ridges																		
IMPORTANT																		
Central Sand Hills																		
Western Prairie																		
PRESENT (MINOR)																		
Southeast Glacial Plains																		
Southwest Savanna																		

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-92. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with sand prairie communities and their association with Ecological Landscapes that support sand prairie.

Sand Prairie Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (5)*					Herptiles (1)
	Upland Sandpiper	Loggerhead Shrike	Bell's Vireo	Eastern Meadowlark	Western Meadowlark	Prairie Ringneck Snake
MAJOR						
Central Sand Plains						
Western Coulee and Ridges						
IMPORTANT						
Central Sand Hills						
Western Prairie						
PRESENT (MINOR)						
Southeast Glacial Plains						
Southwest Savanna						

Color Key

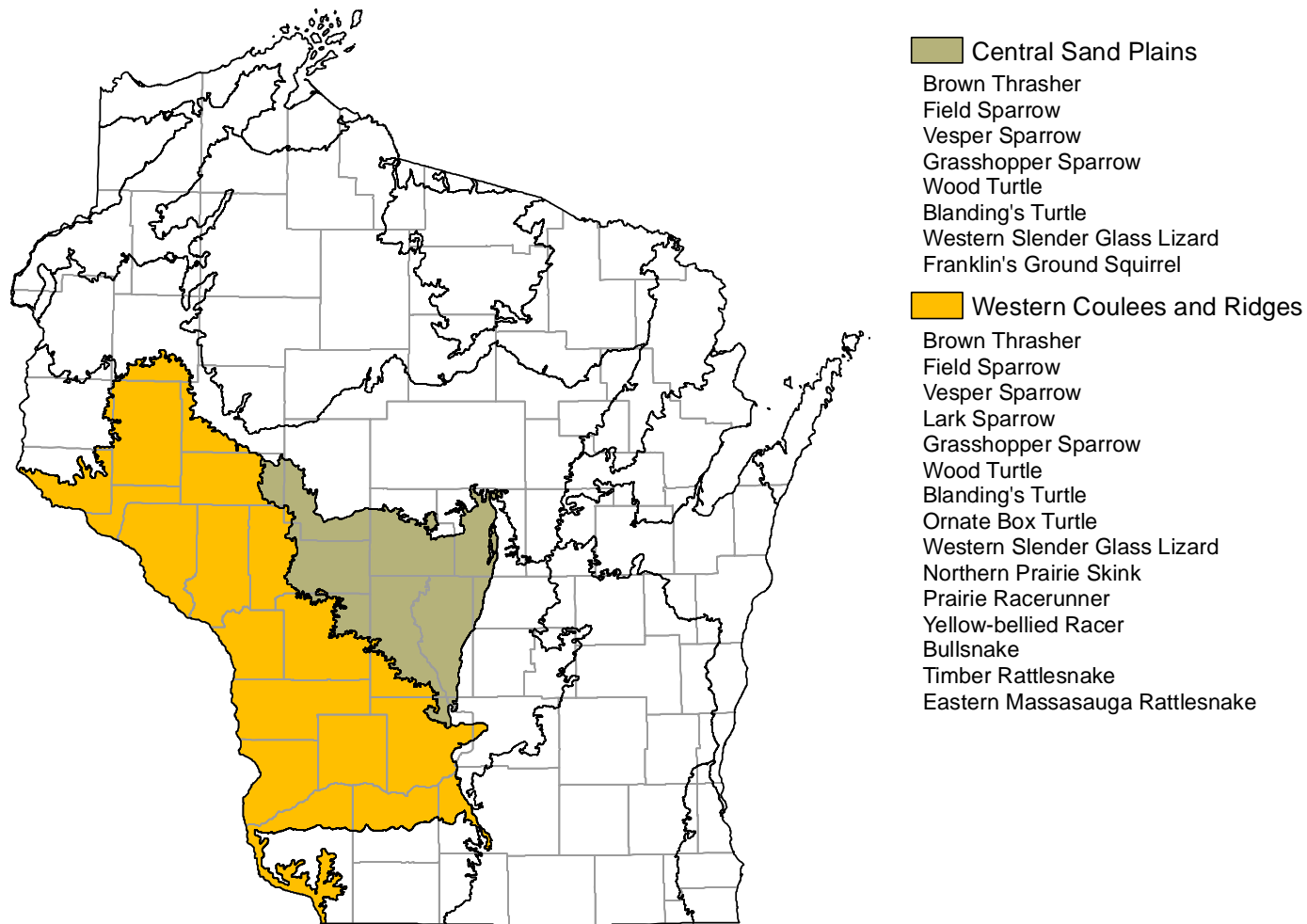
= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-16. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with sand prairie *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of sand prairie.



3.3.3.5.3 Threats and Priority Conservation Actions for Sand Prairie

3.3.3.5.3.1 Statewide Overview of Threats and Priority Conservation Actions for Sand Prairie

The following list of threats and priority conservation actions were identified for sand prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.5.3.2 unless otherwise indicated.

Threats and Issues

- This community type is fragile and can be easily damaged.
- Off-road vehicle use can damage sensitive vegetation and aid the spread of invasive plants.
- At sites that were either part of or adjacent to barrens complexes, the removal of all tree cover is not necessarily desirable, as that can cause excessive desiccation, the loss of organic matter, and remove habitat niches needed by certain animals.
- Lack of fire and the encroachment of woody plants can be a problem, but fire frequency and severity should be planned carefully especially at excessively dry sites.
- Small, isolated sites are vulnerable to species loss, which can be permanent unless extreme measures such as reintroduction are taken.
- Invasive plants such as leafy spurge, cypress spurge, and spotted knapweed are major threats.
- Conversion to pine plantations has been common in some areas, and in addition to replacing an already rare native community type, the conversion can damage or destroy prairie vegetation, isolate the remnant prairie patches, and contribute to fragmentation of the formerly contiguous grassy openings.

Priority Conservation Actions

- Conservation activities should be incorporated into the management of other grasslands, surrogate prairie grasslands, barrens, and other open habitats where possible.
- Restoration is now occurring on some public lands, mostly in central and southwestern Wisconsin.
- Synthesize existing information that has been collected for this type in Wisconsin and other parts of the upper Midwest, and make it accessible to managers.
- Use prescribed burning as a tool to manage these sites, following guidelines developed specifically for sand prairies and the fire-sensitive species that are dependent on or strongly associated with this community.
- Protect sensitive areas from off-road vehicles.
- Continue to support research to find effective biocontrols for invasive plants; control the spread of new invasives by limiting activities that facilitate their spread where possible.

3.3.3.5.3.2 Additional Considerations for Sand Prairie by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of sand prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for sand prairie found in Section 3.3.3.5.3.1.

Additional Considerations for Sand Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Central Sand Plains

Limited restoration is occurring on public lands such as Dike 17 State Wildlife Area within the Black River State Forest (Jackson County), Sandhill State Wildlife Area (Wood County), and Mirror Lake State Park (Sauk County). At these sites, the restoration of sand prairie is occurring in conjunction with efforts to restore oak and pine barrens communities.

Western Coulees and Ridges

Opportunities to manage or restore this type exist on the broad sand terraces of the Mississippi, Wisconsin, Chippewa, and Black Rivers. Conversion to pine plantations has occurred at many locations. Farming was attempted at some locations and generally failed. Residential development is rapidly encroaching on sand prairie habitat near urban population centers. Restoration is occurring at the following sites: Lower Chippewa River State Natural Area (Buffalo, Dunn, and Pepin Counties), Dunnville Wildlife Area (Dunn County), Trempealeau National Wildlife Refuge (Trempealeau County), Fort McCoy Military reservation (Monroe County), Blue River Sand Barrens and Dunes State Natural Area (Iowa County), Schluckebier Sand Prairie (Sauk County), Lone Rock Sand Prairie, and Spring Green Preserve.

Additional Considerations for Sand Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Central Sand Hills

The few sites documented are small and isolated. Grazing has been, and is, a problem, as is the planting of conifers. Additional survey work is desirable in this Ecological Landscape to identify high quality sand prairie remnants.

Western Prairie

Opportunities are limited and appear to be confined to terraces or steep bluffs associated with the St. Croix River and its major tributaries. Additional survey work is needed to document the sites with the highest conservation value.

3.3.3.6 Wet Prairie

3.3.3.6.1 Community Overview

This is a rather variable tall grassland community that shares characteristics of prairies, southern sedge meadow, calcareous fen and even emergent aquatic communities. The wet prairies' more wetland-like character can mean that sometimes very few obligate prairie species are present. Many of the stands assigned to this type by Curtis are currently classified as wet-mesic prairies. In wet prairie the dominant graminoids may include Canada bluejoint grass, cordgrass, and marsh wild-timothy, plus several sedge species including lake sedge, water sedge, and woolly sedge. Many of the herbs are shared with the wet-mesic prairies, but the following species are often prevalent: New England aster, swamp thistle, northern bedstraw, yellow stargrass, cowbane, tall meadow-rue, golden alexander, and mountain-mint.

3.3.3.6.2 Vertebrate Species of Greatest Conservation Need Associated with Wet Prairie

Twenty-three vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with wet prairie (Table 3-93).

Table 3-93. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with wet prairie communities.

<i>Species Significantly Associated with Wet Prairie</i>	
Birds	
Bobolink	
Herptiles	
Blanchard's Cricket Frog	
Pickereel Frog	
Blanding's Turtle	
Queen Snake	
Butler's Garter Snake	
Eastern Massasauga Rattlesnake	
<i>Species Moderately Associated with Wet Prairie</i>	
Birds	
Blue-winged Teal	
Northern Harrier	
Greater Prairie-chicken	
American Golden Plover	
Upland Sandpiper	
Marbled Godwit	
Buff-breasted Sandpiper	
Barn Owl	
Short-eared Owl	
Willow Flycatcher	
Bell's Vireo	
Henslow's Sparrow	
Le Conte's Sparrow	
Herptiles	
Wood Turtle	

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-93 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both wet prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of wet prairie in each of the Ecological Landscapes (Tables 3-94 and 3-95).

Table 3-94. Vertebrate Species of Greatest Conservation Need that are (or historically were) significantly associated with wet prairie communities and their association with Ecological Landscapes that support wet prairie.

Wet Prairie Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (1)*	Herptiles (6)					
	Bobolink	Blanchard's Cricket Frog	Pickereel Frog	Blanding's Turtle	Queen Snake	Butler's Garter Snake	Eastern Massasauga Rattlesnake
IMPORTANT							
Central Sand Hills							
Southeast Glacial Plains							
Southern Lake Michigan Coastal							
Western Coulee and Ridges							
PRESENT (MINOR)							
Central Sand Plains							
Southwest Savanna							
Western Prairie							

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-95. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with wet prairie communities and their association with Ecological Landscapes that support wet prairie.

Wet Prairie	Birds (13)*													Herptiles (1)
	Blue-winged Teal	Northern Harrier	Greater Prairie-Chicken	American Golden Plover	Upland Sandpiper	Marbled Godwit	Buff-breasted Sandpiper	Barn Owl	Short-eared Owl	Willow Flycatcher	Bell's Vireo	Henslow's Sparrow	Le Conte's Sparrow	Wood Turtle
IMPORTANT														
Central Sand Hills														
Southeast Glacial Plains														
Southern Lake Michigan Coastal														
Western Coulee and Ridges														
PRESENT (MINOR)														
Central Sand Plains														
Southwest Savanna														
Western Prairie														

Color Key

 = HIGH probability the species occurs in this Ecological Landscape
 = MODERATE probability the species occurs in this Ecological Landscape
 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

3.3.3.6.3 Threats and Priority Conservation Actions for Wet Prairie

3.3.3.6.3.1 Statewide Overview of Threats and Priority Conservation Actions for Wet Prairie

The following list of threats and priority conservation actions were identified for wet prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.3.6.3.2 unless otherwise indicated.

Threats and Issues

- Most sites are small and isolated.
- Past drainage for agriculture had major negative impacts on this community type, and subsequent impacts from surrounding agriculture affected many wet prairie remnants.
- Lack of fire is a problem.
- Past grazing has degraded many sites. Grazing can remove certain plant species and alter the composition of the community.
- Invasives are a major problem, as they can out-compete native species.
- Sedimentation, pollution, and pesticide drift from surrounding agricultural areas can lead to changes in composition, and encourage invasive plants.
- Housing development and urban expansion can limit the opportunity to manage with prescribed fire.
- More information is needed to manage the natural variability of the community type.

Priority Conservation Actions

- Preserve and manage the few remaining sites.
- Protect or restore site hydrology, and limit runoff of nutrients and sediments from agricultural fields and residential areas.
- Restore existing degraded sites of this community type, or revegetate suitable sites.
- Prevent grazing.
- Fire is less frequent here than in other prairie types, but necessary for maintaining the type. Develop educational tools and demonstration areas that promote benefits of prescribed fire, and address liability concerns. Follow existing management guidelines to minimize impacts on sensitive species.
- Continue and support research to find biocontrols for invasives; control spread of new invasives. Control existing invasives on a site-by-site basis.
- Monitor these sites to determine whether management is maintaining native diversity.
- Collect additional data on vegetative structure and composition to resolve classification issues, and provide better baseline information on the composition and structure of the community. In the meantime, the most effective management strategy would be to manage and connect wet prairie with other open grasslands, including wet-mesic and mesic prairies, southern sedge meadow, calcareous fen, emergent marsh, and surrogate prairie grasslands. This would benefit not only obligate prairie specialists, but would be more likely to support area sensitive open habitat species.

3.3.3.6.3.2 Additional Considerations for Wet Prairie by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of wet prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for wet prairie found in Section 3.3.3.6.3.1.

Additional Considerations for Wet Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

No Ecological Landscapes with major opportunities for wet prairie have been identified (but please see major opportunity Ecological Landscapes for wet-mesic prairie (Section 3.3.3.7) and southern sedge meadow (Section 3.3.8.14) for related information).

Additional Considerations for Wet Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Central Sand Hills

Good occurrences have been documented at Fountain Creek Prairie State Natural Area (within Grand River Marsh State Wildlife Area, Green Lake County) and Upper Chaffee Creek Meadow State Fishery Area (Marquette County).

Southeast Glacial Plains

Most prairie sites are small and somewhat isolated. Invasives such as reed canary grass, purple loosestrife, and giant reed are significant management problems in some areas. Good opportunities to manage and restore this type occur at some of the larger wet grassland sites in this Ecological Landscape, such as Scuppernong Prairie in the South Unit of the Kettle Moraine State Forest. Small remnants also occur embedded within other large grassland management opportunities in this Ecological Landscape, such as Bong State Recreation Area (Kenosha County), Waterloo Prairie State Natural Area (Jefferson and Dodge Counties), and Cherokee Marsh State Natural Area (Dane County).

Southern Lake Michigan Coastal

Increasing population levels due to the proximity of a major metropolitan area have resulted in rapidly expanding urban development.

Chiwaukee Prairie is a complex dominated by wet-mesic prairie that also includes wet prairie, mesic prairie, calcareous fen, southern sedge meadow, and oak openings. Coordinated management of Chiwaukee Prairie with Illinois Beach State Park should be explored. Existing prairie remnants should be preserved. Management of stormwater runoff is a major concern in this area, as is maintenance of site hydrology, and continued residential expansion.

Western Coulees and Ridges

Only small, relatively isolated, degraded remnants are known from this Ecological Landscape. Conversion of wet meadow and prairie to marsh has occurred in some constructed impoundments. Reed canary grass is a serious wetland problem in much of this Ecological Landscape. Stands of cordgrass occur in some of the large open wetlands along the Mississippi River.

3.3.3.7 Wet-Mesic Prairie

3.3.3.7.1 Community Overview

This herbaceous grassland community is dominated by tall grasses, including big bluestem, Canada bluejoint grass, cordgrass, and Canada wild-rye. The forb component is diverse and includes azure aster, Eastern shooting-star, sawtooth sunflower, prairie blazing-star, prairie phlox, prairie coneflower, prairie docks, late and stiff goldenrods, and culver's-root. This community type was common historically but now is rare. Well over 99% of our tallgrass prairies – including wet-mesic prairie – have been destroyed.

Wet-mesic prairie sometimes occurred in large wetland complexes with wet prairie, southern sedge meadow, calcareous fen, and emergent marsh communities. It was most abundant on level or gently rolling glacial moraine or outwash landforms where there were few natural barriers to wild fire, and where the upland vegetation was composed mostly of fire-dependent communities such as Mesic prairie and Oak opening.

3.3.3.7.2 Vertebrate Species of Greatest Conservation Need Associated with Wet-Mesic Prairie

Twenty-three vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with wet-mesic prairie (Table 3-96).

Table 3-96. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with wet-mesic prairie communities.

<i>Species Significantly Associated with Wet-Mesic Prairie</i>
Birds
Northern Harrier
Greater Prairie-chicken
Short-eared Owl
Bobolink
Herptiles
Pickerel Frog
Butler's Garter Snake
Eastern Massasauga Rattlesnake
<i>Species Moderately Associated with Wet-Mesic Prairie</i>
Birds
Blue-winged Teal
Northern Bobwhite
American Golden Plover
Upland Sandpiper
Marbled Godwit
Buff-breasted Sandpiper
Barn Owl
Willow Flycatcher
Bell's Vireo
Field Sparrow
Henslow's Sparrow
Le Conte's Sparrow
Eastern Meadowlark
Herptiles
Blanding's Turtle
Western Ribbon Snake
Mammals
Franklin's Ground Squirrel


In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-96 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both wet-mesic prairie and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:


- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of wet-mesic prairie in each of the Ecological Landscapes (Tables 3-97 and 3-98).
- Using the analysis described above, a species was further selected if it had both a significant association with wet-mesic prairie and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of wet-mesic prairie. These species are shown in Figure 3-13.


Table 3-97. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with wet-mesic prairie communities and their association with Ecological Landscapes that support wet-mesic prairie.

Wet-Mesic Prairie Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type	Birds (4)*				Herptiles (3)		
	Northern Harrier	Greater Prairie-Chicken	Short-eared Owl	Bobolink	Pickrel Frog	Butler's Garter Snake	Eastern Massasauga Rattlesnake
MAJOR							
Central Sand Hills							
Southeast Glacial Plains							
Southern Lake Michigan Coastal							
IMPORTANT							
Southwest Savanna							
Western Coulee and Ridges							
PRESENT (MINOR)							
Central Sand Plains							

Color Key

 = HIGH probability the species occurs in this Ecological Landscape

 = MODERATE probability the species occurs in this Ecological Landscape

 = LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-98. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with wet-mesic prairie communities and their association with Ecological Landscapes that support wet-mesic prairie.

Wet-Mesic Prairie	Birds (13)*													Herptiles (2)		Mammals (1)
	Blue-winged Teal	Northern Bobwhite	American Golden Plover	Upland Sandpiper	Marbled Godwit	Buff-breasted Sandpiper	Barn Owl	Willow Flycatcher	Bell's Vireo	Field Sparrow	Henslow's Sparrow	Le Conte's Sparrow	Eastern Meadowlark	Blanding's Turtle	Western Ribbon Snake	Franklin's Ground Squirrel
MAJOR																
Central Sand Hills																
Southeast Glacial Plains																
Southern Lake Michigan Coastal																
IMPORTANT																
Southwest Savanna																
Western Coulee and Ridges																
PRESENT (MINOR)																
Central Sand Plains																

Color Key

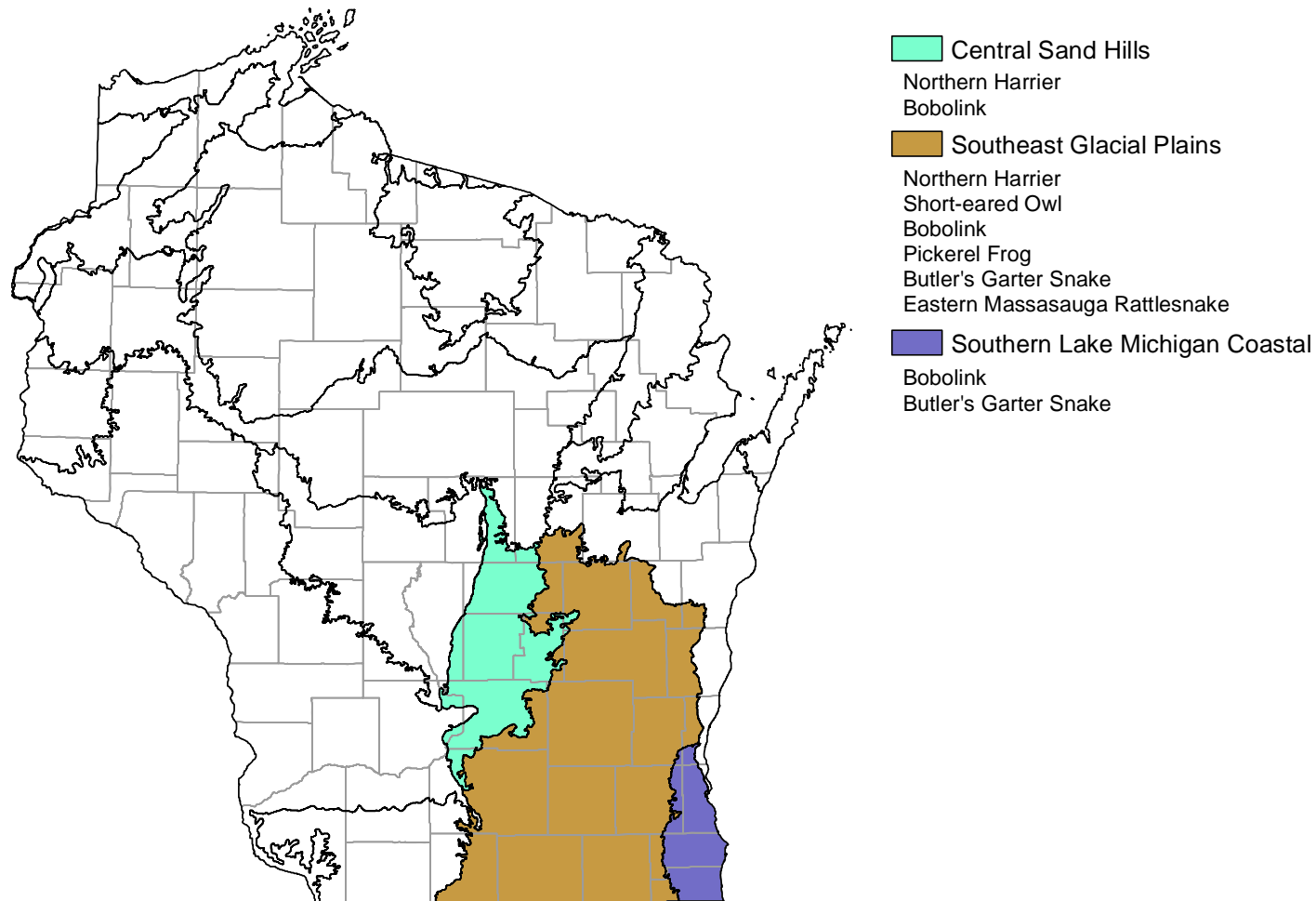
= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-17. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with wet-mesic prairie *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of wet-mesic prairie.



3.3.3.7.3 Threats and Priority Conservation Actions for Wet-Mesic Prairie

3.3.3.7.3.1 Statewide Overview of Threats and Priority Conservation Actions for Wet-Mesic Prairie

The following list of threats and priority conservation actions were identified for wet-mesic prairie in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.73.3.3.2 unless otherwise indicated.

Threats and Issues

- Many sites of this community type were historically converted to agricultural uses through drainage and degraded by pasturing. Grazing can cause simplification (e.g., increase of aggressive native plants such as wild sunflowers, asters, Joe-pye weed, and stinging nettles, at the expense of other species) and encourage the expansion of invasive non-native plants. Most grazing occurred in the past, but some remnants are still grazed. Long-term grazing renders these sites unrestorable.
- Most remaining sites are small and isolated and are difficult to manage.
- Managing for invertebrates is needed but complicates management.
- Genetic diversity may be declining, as is species diversity.
- Invasive plants such as reed canary grass, purple loosestrife, and wild parsnip are a major problem and can out-compete and replace native species.
- Conversion of prairie to woody species is also a major problem. Wet-mesic prairie is prone to serious and relatively rapid encroachment by woody plants in the absence of fire.
- More information is needed to manage the full range of natural variability of this community type.
- Land use planning that is not comprehensive and does not emphasize conservation considerations can lead to development in locations that limit options for restoring and managing this community. Housing developments and other forms of urban expansion can limit the opportunity to manage with prescribed fire.

Priority Conservation Actions

- Preserve and manage remaining sites.
- Restore existing degraded sites of this community type, emphasizing restoration of hydrology. Revegetate suitable sites, where remnants make this worthwhile.
- Promote private management (e.g., Prairie Enthusiasts) of small sites where possible. Offer incentives to private landowners for preservation or restoration of this community type.
- Manage this community type within a matrix of surrogate prairie grasslands and other open habitats for area sensitive species, and for those species that utilize different vegetation types at different stages in their life cycles. Link habitats to allow for dispersal and gene flow.
- Consider needs of fire-sensitive invertebrates when burning and burn only part of a site each year, except in the early stages of planted prairie reconstructions. Follow existing WDNR management guidelines for prescribed burning to minimize impacts on sensitive species.
- Develop educational tools and demonstration areas that promote benefits of prescribed fire, and address liability concerns.
- Provide incentives to prevent grazing and control or eliminate invasives.
- Control runoff from surrounding agricultural areas that may contribute nutrients and sediment, which can encourage invasive species. Limit herbicide drift from surrounding agricultural areas that can lead to changes in species composition and encourage invasive plants.
- Continue and support research to find biocontrols for invasives; control spread of new invasives.
- Monitor these sites to determine whether management is maintaining native diversity.

3.3.3.7.3.2 Additional Considerations for Wet-Mesic Prairie Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of wet-mesic prairie exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for wet-mesic prairie found in Section 3.3.7.3.3.1.

Additional Considerations for Wet-Mesic Prairie in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

Central Sand Hills

There are significant management opportunities for wet-mesic prairie in this Ecological Landscape. Opportunities and examples of this type occur at Comstock and Germania Marshes, Fountain Creek Prairie, and Muir Park State Natural Area (all in Marquette County).

Southeast Glacial Plains

This community type formerly existed in swales between drumlins, on borders of sedge meadows along lakes and streams (e.g., Bark River, Sugar River, Scuppernong Creek, Crawfish River), and in abandoned river channels. The largest and most diverse remnants are in the southern part of the Kettle Moraine region; there is an opportunity for managing wet-mesic prairie along with other wetland types, mesic prairie, and oak opening. Most grazing occurred in the past, but some remnants are still grazed; grazing should be discontinued because long-term grazing renders these sites unrestorable. Sedimentation, pollution, and herbicide drift from surrounding agricultural areas are important considerations in this Ecological Landscape that can lead to changes in composition and encourage invasive plants. There may be some large-scale management opportunities at Faville Prairie (Jefferson County) and Waterloo Wildlife Management Area (Jefferson and Dodge Counties) to manage this type with other marsh, sedge meadow and surrogate prairie grassland communities. Other opportunities to manage for this type occur at Young Prairie State Natural Area (Jefferson and Walworth Counties), White River State Wildlife Management Area and Puchyan Prairie (Green Lake County), Scuppernong and Snapper Prairies (Jefferson County), and Kettle Moraine Low Prairie (Waukesha County)

Southern Lake Michigan Coastal

Increasing population associated with metropolitan areas is causing rapidly increasing development. Most sites are small and isolated. An exception is Chiwaukee Prairie, which is one of only a very few large occurrences of wet-mesic prairie in the state. Wet-mesic prairie is the most prevalent community type at Chiwaukee Prairie, a complex that also includes wet prairie, mesic prairie, calcareous fen, southern sedge meadow, and oak openings. Coordinated management of Chiwaukee Prairie with Illinois Beach State Park should be explored. Invasive plants are a problem in this Ecological Landscape. Encroachment by woody shrubs (e.g., gray and red-osier dogwoods) is also a problem. Sedimentation and pollution from surrounding agricultural and urban areas are important considerations in this Ecological Landscape and can lead to changes in composition and encourage invasive plants, especially in the smaller isolated sites.

Additional Considerations for Wet-Mesic Prairie in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Southwest Savanna

This type is rare in this Ecological Landscape but a few restoration possibilities exist. There are some sites of less than an acre in size that occur along river corridors that have expansion possibilities.

Western Coulees and Ridges

This type is rare in this Ecological Landscape. Past conversion to agriculture has impacted nearly all former wet-mesic prairies. All sites are small and isolated, with the notable exception of Avoca Prairie in Iowa County. Sites should be preserved, buffered, and enlarged where they exist. Connectivity should be maintained or restored where possible. Restoration of wet-mesic prairie is also needed. There are some small, brushy remnants in the Baraboo River Valley. Additional survey work there and in some of the other river valleys might yield positive results, although the vast majority of the lowlands have been converted to agricultural uses.